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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 4831	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/IT2003/000492	International filing date *(day/month/year)* 01.08.2003	Priority date *(day/month/year)* 01.08.2003
International Patent Classification (IPC) or both national classification and IPC G01H1/00		
Applicant EDILCONTROL S.R.L. ET AL.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
23.02.2005	26.10.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer De la Cruz Valera, D Telephone No. +31 70 340-4541

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IT2003/000492

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-6 as originally filed

Claims, Numbers

1-11 received on 03.10.2005 with letter of 03.10.2005

Drawings, Sheets

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-11
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-11
Industrial applicability (IA)	Yes:	Claims	1-11
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following document:

   D1: US-A-4 956 999 (BOHANNAN WILLIAM L ET AL) 18 September 1990 (1990-09-18)

2. The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document) a system for monitoring the stability status of building structures made of steel, wood, reinforced concrete or other suitable material, comprising, in combination, a management and control station (item 30) thereto one or more seismic and/or vibrational sensors of known type are connected (Col.11, lines 9-18, and at least (...)signaller which is activated by the management station itself in case said bearing structures are subjected to stresses so as to induce tensions considered dangerous (Col. 18, lines 46-58), whereby said sensors are respectively calibrated on the band of the yielding characteristic frequencies peculiar to the bearing structure thereon they are fastened and are suitable to signal the presence of dangerous stresses (Col. 1, lines 58-63; Col. 6, line 31 "Crystallization"; Col. 11, lines 36-43; Col. 18, lines 25-45, see also comment below), well before the structure starts really to collapse; thus obtaining that, in case of danger, the present personnel could have the time for abandoning the structures which are going to collapse or for intervening if possible. (This is obviously the aim of any such system. The latter feature being merely a purposive one, not delimited by technical characteristics. The scope of the claim is not clearly determined, and the claim does neither fulfil the requirements of Art. 6 PCT).

   It has to be added tat any system analysing a structure's integrity, will base its analyse on the closeness to the point of plasticity (or crystallization, as in the description, in page 1, line 26), since it marks the no return situation for the structure's bearing capability. Unavoidably, the sensors to detect such phenomena will need to be calibrated, on a per structure basis, to respond to acoustic signatures within the necessary frequencies. The mentioning of such a calibration cannot serve

as a basis to asses the presence of inventive step.

Furthermore, the mere reference to the signaller being acoustic and optical cannot serve as a basis for assessing the presence of inventive step, being the alarming upon the occurrence of specific stresses already regarded in D1.

The subject matter of claim 1 does not involve an inventive step as required by Art 33(3) PCT

3. Analogously, D1 discloses the features in claims 7 and 9, which do not fulfil the criteria set forth in Art. 33(3), since their subject matter does not involve an inventive step. Additional features present in these claims, such as the device being portable or featuring "power batteries" are normal design options. In particular, it's a commonplace measure to dispose portable gauge systems for detecting structural stresses. The mere reference to the system as being "portable" can not be regarded as a basis for assessing the presence of inventive step. See thereto D1 , Col.10 line 62- Col. 11 line 8.
Likewise, and as said above, the claimed calibration of sensors to adapt to the characteristic frequencies of the structure and material are common steps in any structure monitoring, and cannot serve as a basis for assessing the presence of inventive step. A knowledge of the structure response to excitations, its plastification limits, and its subsequent characterization is always needed. On such basis, either or both of a specific frequency response calibration or a filtering (as in D1) so that these frequencies are taken into account are unavoidable steps in any structure monitoring system.

Claims 7 and 9 do not involve an inventive step. Art. 33(3) PCT

4. The dependent claims do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step. They contain usual characteristics present in alarm systems in general, and in disaster monitoring in particular. In particular
- Claim 2 merely restricts the system to a monitoring system monitoring in real time seismic activity, dangerous or not, as disclosed by D1.
- The Characteristics in Claims 3, expresses the possibility of forwarding the

information by the system. A commonplace measure to deploy in any monitoring system.

- Claims 4 and 11 only refer to the most common sensor types in this kind of monitoring systems (inertial or piezo accelerometers -as in D1- or microphones, typical from any acoustic emission structure monitoring system).
- Claims 5, 6 and 8 only establish necessary measures for the proper functioning of a system subject to particular environmental restrictions (power failures, typical in earthquake cases, and rugged enclosure, mandatory in case the system is installed in an exposed environment) that the person skilled in the art would undertake in order to solve the underlying problems without intervention of the required inventive step.

CLAIMS

1. System for monitoring the stability status of building structures made of steel, wood, reinforced concrete or other suitable material, comprising, in combination, a management and control station (C) thereto one or more seismic and/or vibrational sensors (S) of known type are connected, and at least an acoustic and optical signaller (A) which is activated by the management station (C) itself in case said bearing structures are subjected to stresses so as to induce tensions considered dangerous, characterized in that said sensors (S) are respectively calibrated on the band of the yielding characteristic frequencies peculiar to the bearing structure thereon they are fastened and are suitable to signal the presence of dangerous stresses, well before the structure starts really to collapse; thus obtaining that, in case of danger, the present personnel could have the time for abandoning the structures which are going to collapse or for intervening if possible.

2. System according to the preceding claim, characterized in that the signals emitted by said vibrational sensors (S) are continuously monitored by the management station (C), by means of connections of known type through wires or radio waves, in order to detect in real time the occurrence of phenomena showing the presence of structural stresses as from the initial phase thereof, during which the tensions which generate the vibratory phenomena have an extent so as not to represent a danger, but however detectable by means of appropriate seismic sensors.

3. System according to anyone of the preceding claims, characterized in that the control station (C) is equipped with means for communicating with the outside and/or with a broader monitoring network including several building structures, as well as the main offices of firemen, hospitals, police and all those aid and/or security forces which have to intervene in case of emergency and danger for the safety of people or things.

4. System according to one or more of the preceding claims, characterized in that said seismic sensors (S) are constituted by inertia mechanical accelerometers and/or by piezodynamic sensors able to pick up even the oscillations of the structures and which have a known detection band.

5. System according to one or more of the preceding claims, characterized in that both the single sensors (S) and the station (C) with the alarm signaller (A), are powered by the supply mains and/or by their own battery which guarantees them to operate even in case of power failure.

6. System according to one or more of the preceding claims, characterized in that the vibrational sensors (S) are equipped with thermo-protective cases.

7. Portable device for monitoring the stability status of building structures made of steel, wood, reinforced concrete or other suitable material, comprising at least a seismic and/or vibrational sensor (S) of known type, equipped with means of known type for the calibration thereof, and at least an acoustic and optical signaller (A) which is activated by the

sensor (S) itself in case the bearing structure itself is subjected to stresses so as to induce tensions considered dangerous characterized in that said calibration means are suitable to calibrate said sensors (S) on the band of the yielding characteristic frequencies peculiar to the material of the bearing structure whereon it has to be fastened; said device being equipped with power batteries.

8. Portable device according to the preceding claim, characterized in that it is equipped with a container protecting against the atmospheric agents, apt to protect it against high temperatures as well, for a time sufficient to give the alarm.

9. System for monitoring the stability status of building structures made of steel, wood, reinforced cement or other suitable material, comprising, in combination, a management and control station (C) which filters, analyzes and processes the signals received by one or more seismic and/or vibrational sensors (S) of known type, and at least an acoustic and optical signaller (A) which is activated by the management station (C) itself in case said bearing structures are subjected to stresses so as to induce tensions considered dangerous characterized in that the filtering, analyzing and processing performed by said control station (C) is intended for detect any signal from the sensors (S) which belongs to the band of the yielding characteristic frequencies peculiar to the bearing structure thereon the sensors (S) are fastened; thus obtaining that, in case of danger, the present personnel could have the time for abandoning the

structures which are going to collapse or for intervening if possible.

10. System according to the preceding claim, characterized in that in said management and control station (C) the selection of the interesting band and the filtering of the signal received by the sensors (S) take place inside the station itself by means of software or hardware processing.

11. System according to claim 9 or 10, characterized in that the sensors (S) are simple microphones.